

OSTEOSCOOP

News on current events in osteoporosis and rheumatology

Strontium ranelate induces a program gene expression during osteoblast differentiation

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Osteoporosis is a progressive and debilitating disease that is characterized by massive bone loss during the first 10 years following the menopause, with a deterioration of bone tissues, and propensity for fragility fractures. Until recently, the major drugs to treat osteoporosis were inhibitors of bone remodeling reducing both bone resorption and formation, or anabolic drugs, increasing bone remodeling by enhancing bone formation, but also increasing bone resorption. Strontium ranelate is the first antiosteoporotic treatment that has dual mode of action and simultaneously increases bone formation, while decreasing bone resorption, thus rebalancing bone turnover of favor of bone formation.

In the present study, Zhu et al. [1] examined in vitro the effect of strontium ranelate on gene expression in osteoblasts, as well as the formation of mineralized colony-forming unit-osteoblasts (CFU-obs). Bone marrow-derived stromal cells in culture, when exposed to strontium ranelate, displayed a significant increase in the expression of the master gene, *Runx2*, as well as bone sialoprotein (BSP), but without effects on osteocalcin. This was associated with a significant increase in the formation of CFU-obs. In preosteoblastic cells, strontium ranelate significantly enhanced the expression of *Runx2* and osteocalcin, but not BSP. Late, more mature osteoblastic OB-6 cells showed significant elevations in BSP and osteocalcin, but with only minimal effects on *Runx2*.

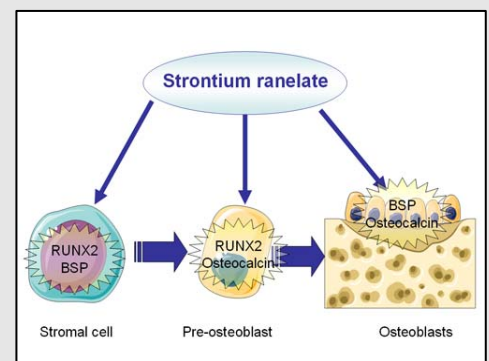
In conclusion, strontium ranelate stimulates osteoblast differentiation, but the induction of the program of gene expression appears to be cell type-specific and dependent on the maturation stage. The increased osteoblastic differentiation is the likely basis underlying the therapeutic bone-forming actions of strontium ranelate.

1. Zhu LL et al *Biochem Biophys Res Commun.* 2007;355:307-311.

Strontium ranelate activates gene expression during osteoblast differentiation

Genes activated by strontium ranelate depend on the differentiation stage: RUNX2 and bone sialoprotein (BSP) in bone marrow-derived cells, RUNX2 and osteocalcin in preosteoblasts, BSP and osteocalcin in mature osteoblasts.

The increased osteoblastic differentiation is the likely basis underlying the therapeutic bone-forming actions of strontium ranelate.



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